EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Eric D. Babych (Reg. No. 57,542) on March 13, 2009.

The application has been amended as follows:

In the claims:

66. (Currently Amended) A production method for a highly stable polymer comprising the steps of:

(1) reacting a polymer having a principal chain including at least a component unit having a pendant acidic group and a component unit having a pendant hydroxyl group with an isocyanate compound until an isocyanate group, as measured by an IR absorption spectrum at a peak of 2,200cm^{-1}, is no longer present to form an intermediate product, said intermediate product featuring: pendant groups having amido linkages and/or pendant groups having urethane linkages, and pendant acid anhydride groups formed by dehydration of un-reacted acidic groups;

(2) preparing a solution by dissolving or dispersing the intermediate product in a solvent; and

(3) adding an alcohol to the solution, before viscosity rise of the solution or before completion of viscosity rise of the solution, and thereby reacting the alcohol with said pendant acid anhydride groups of the intermediate product;

wherein said alcohol has about 1 to 20 carbon atoms and is selected from the group consisting of linear alkanols, cellosolve-based alcohols, carbitol-based alcohols, ether-based alcohols, and ethylenically unsaturated alcohols.

67. (Cancelled)

68. (Currently Amended) The production method for a highly stable polymer according to claim 66, wherein the polymer solution is left or heated for a predetermined time for maturation after the addition of the alcohol.

69. (Currently Amended) The production method for a highly stable polymer according to claim 68, wherein the polymer solution is matured at 30 to 170°C for a period within 72 hours.

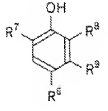
73. (Currently Amended) The production method for a highly stable polymer according to claim 66, wherein said polymer having a principal chain including at least a component unit having a pendant acid group and a component unit having a pendant hydroxyl group is a polymer formed using a non-nitrile azo-based polymerization initiator or a peroxide-based polymerization initiator.

80. (Currently Amended) The hardenable resin composition according to claim 103, wherein the polymer solution is left or heated for a predetermined time for maturation after the addition of the alcohol.

81. (Currently Amended) The hardenable resin composition according to claim 103, wherein the alcohol has a boiling point with a 75°C or less difference with respect to the boiling point of the solvent to be used and/or an evaporation rate with a 90(n-BuOAc=100) or less difference with respect to the evaporation rate of the solvent.

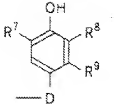
83. (Currently Amended) The hardenable resin composition according to claim 103, wherein said polymer having a principal chain including at least a component unit having a pendant acid group and a component unit having a pendant hydroxyl group is a polymer formed using a non-nitrile azo-based polymerization initiator or a peroxide- based polymerization initiator, and the polymer is reacted with the isocyanate compound, using a polymerization inhibitor selected from the group consisting of a phenol-based compound represented by the below-mentioned formula (10) and a phosphite-based compound represented by the below mentioned formula (16):

Formula (10)



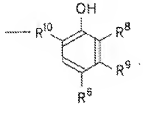
wherein R^6 is hydrogen, and alkyl group having 1 to 5 carbon atoms, or the below mentioned formula (11):

Formula (11)



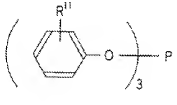
wherein D in the formula (11) is-S-, an alkylene group having 1 to 10 carbon atoms or an alkylidene group having 1 to 10 carbon atoms, R^7 is hydrogen or an alkyl group having 1 to 10 carbon atoms, R^8 is hydrogen, an alkyl group having 1 to 10 carbon atoms, or the below-mentioned formula (12):

Formula (12)



wherein R^{10} in the formula (12) is an alkylene group having 1 to 10 carbon atoms or an alkylidene group having 1 to 10 carbons atoms, R^9 is hydrogen or an alkyl group having 1 to 10 carbon atoms, however, at least one R^7 and R^8 is a tert-butyl group, or an alkyl group having a cyclohexyl group, and substituents of the same numeral can either be same or different,

Formula (16)



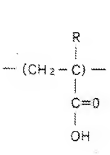
wherein R^{11} is hydrogen or an alkyl group having 1 to 20 carbon atoms.

84. (Currently Amended) The hardenable resin composition according to claim 83, wherein said highly stable polymer has a light transmittance of a 3-methoxy butyl acetate solution of a 20% by weight resin solid component placed in a 1 cm square quartz cell at 400 nm being 60% or more.

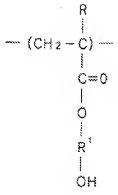
85. (Currently Amended) The hardenable resin composition according to claim 83, wherein said highly stable polymer has a light transmittance of 3-methoxy butyl acetate solution of a 20% by weight resin solid component placed in a 1 cm square quartz cell at 360 nm being 50% or more.

87. (Currently Amended) The production method for a hardenable resin composition according to claim 105, wherein the principal chain of the polymer comprises at least a component unit represented by the below-mentioned formula (1) and a component unit represented by the below-mentioned formula (2):

Formula (1)



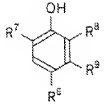
Formula (2)



wherein R is hydrogen or alkyl group having 1 to 5 carbon atoms, and R^1 is an alkylene group having 2 to 4 carbons atoms; the isocyanate compound is a radical polymerizable group-containing isocyanate compound, and the polymer solution is matured at 30 to 170°C for a period within 72 hours.

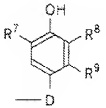
88. (Currently Amended) The production method for a hardenable resin composition according to claim 105, wherein said polymer having a principal chain including at least a component unit having a pendant acid group and a component unit having a pendant hydroxyl group is a polymer formed using a non-nitrile azo-based polymerization initiator or a peroxide- based polymerization initiator, and the polymer is reacted with the isocyanate compound, using a polymerization inhibitor selected from the group consisting of a phenol-based compound represented by the below-mentioned formula (10) and a phosphite-based compound represented by the below mentioned formula (16):

Formula (10)



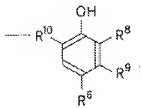
wherein R^6 is hydrogen, and alkyl group having 1 to 5 carbon atoms, or the below mentioned formula (11):

Formula (11)



wherein D in the formula (11) is-S-, an alkylene group having 1 to 10 carbon atoms or an alkylidene group having 1 to 10 carbon atoms, R^7 is hydrogen or an alkyl group having 1 to 10 carbon atoms, R^8 is hydrogen, an alkyl group having 1 to 10 carbon atoms, or the below-mentioned formula (12):

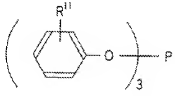
Formula (12)



wherein R^{10} in the formula (12) is an alkylene group having 1 to 10 carbon atoms or an alkylidene group having 1 to 10 carbons atoms, R^9 is hydrogen or an alkyl group having 1 to 10 carbon atoms, however, at least one R^7 and R^8 is a tert-butyl group, or an alkyl group having a

cyclohexyl group, and substituents of the same numeral can either be same or different,

Formula (16)



wherein R^{11} is hydrogen or an alkyl group having 1 to 20 carbon atoms.

89. (Currently Amended) The production method for a hardenable resin composition according to claim 88, wherein ~~a~~ said highly stable polymer has a light transmittance of a 3-methoxy butyl acetate solution of a 20% by weight resin solid component placed in a 1 cm square quartz cell at 400nm being 60% or more.

90. (Currently Amended) The production method for a hardenable resin composition according to claim 88, wherein ~~a~~ said highly stable polymer has a light transmittance of 3-methoxy butyl acetate solution of a 20% by weight resin solid component placed in a 1 cm square quartz cell at 360 nm being 50% or more.

99. (Currently Amended) A highly stable polymer comprising a polymer obtained by the production method according to claim 66, wherein the highly stable polymer contains substantially no acid anhydride groups.

100. (Currently Amended) A highly stable polymer comprising a polymer obtained by the production method according to claim 66, wherein the principal chain further contains component unit having a pendant benzene ring, and wherein the highly stable polymer features pendant acid anhydride groups in an amount such that the area ratio represented by the acid anhydride group (1,783 to 1,822 cm^{-1})/benzene ring (683 to 721 cm^{-1}), is 0.03 or less by the FT-IR spectrum.

102. (Cancelled)

103. (Currently Amended) A hardenable resin composition containing: the highly stable polymer according to claim 99 and other coating materials.

104. (Currently Amended) A hardenable resin composition containing: the highly stable polymer according to claim 100 and other coating materials.

105. (Currently Amended) A production method for a hardenable resin composition comprising the steps of: (1) forming a highly stable polymer according to the production method of claim 66; (2) leaving or heating the polymer solution for a predetermined time for maturation; and (3) adding other coating materials to the matured polymer solution.

106. (Currently amended) The production method for a hardenable resin composition according to claim 105, wherein the alcohol has a boiling point with a 75°C or less difference with respect

to the boiling point of the solvent and/or an evaporation rate with a 90(n-BuOAc=100) or less difference with respect to the evaporation rate of the solvent.

110. (Currently Amended) The highly stable polymer according to claim 99, wherein ~~the~~ said polymer having a principal chain including at least a component unit having a pendant acid group and a component unit having a pendant hydroxyl group is formed using a non-nitrile azo-based polymerization initiator or a peroxide-based polymerization initiator.

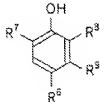
119. (Currently Amended) The highly stable polymer according to claim 100, wherein said polymer having a principal chain including at least a component unit having a pendant acid group and a component unit having a pendant hydroxyl group is formed using a non-nitrile azo-based polymerization initiator or a peroxide-based polymerization initiator.

125. (Currently Amended) The hardenable resin composition according to claim 104, wherein the polymer solution is left or heated for a predetermined time for maturation after the addition of the alcohol.

126. (Currently Amended) The hardenable resin composition according to claim 104, wherein the alcohol has a boiling point with a 75°C or less difference with respect to the boiling point of the solvent to be used and/or an evaporation rate with a 90(n-BuOAc=100) or less difference with respect to the evaporation rate of the solvent.

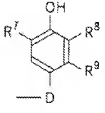
128. (Currently Amended) The hardenable resin composition according to claim 104, wherein said polymer having a principal chain including at least a component unit having a pendant acid group and a component unit having a pendant hydroxyl group is a polymer formed using a non-nitrile azo-based polymerization initiator or a peroxide- based polymerization initiator, and the polymer is reacted with the isocyanate compound, using a polymerization inhibitor selected from the group consisting of a phenol-based compound represented by the below-mentioned formula (10) and a phosphite-based compound represented by the below mentioned formula (16):

Formula (10)



wherein R^6 is hydrogen, and alkyl group having 1 to 5 carbon atoms, or the below mentioned formula (11):

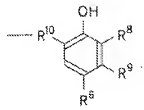
Formula (11)



wherein D in the formula (11) is-S-, an alkylene group having 1 to 10 carbon atoms or an alkylidene group having 1 to 10 carbon atoms, R^7 is hydrogen or an alkyl group having 1 to 10 carbon atoms, R^8 is hydrogen, an alkyl group having 1 to 10 carbon atoms, or the below-

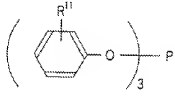
mentioned formula (12):

Formula (12)



wherein R^{10} in the formula (12) is an alkylene group having 1 to 10 carbon atoms or an alkylidene group having 1 to 10 carbons atoms, R^9 is hydrogen or an alkyl group having 1 to 10 carbon atoms, however, at least one R^7 and R^8 is a tert-butyl group, or an alkyl group having a cyclohexyl group, and substituents of the same numeral can either be same or different,

Formula (16)



wherein R^{11} is hydrogen or an alkyl group having 1 to 20 carbon atoms.

129. (Currently Amended) The hardenable resin composition according to claim 128, wherein said highly stable polymer has a light transmittance of a 3-methoxy butyl acetate solution of a 20% by weight resin solid component placed in a 1 cm square quartz cell at 400 nm being 60% or more.

130. (Currently Amended) The hardenable resin composition according to claim 128, wherein said highly stable polymer has a light transmittance of 3-methoxy butyl acetate solution of a 20% by weight resin solid component placed in a 1 cm square quartz cell at 360 nm being 50% or more.

131. (Cancelled)

132. (Currently Amended) A highly stable polymer comprising a polymer obtained by the production method according to claim 66, wherein said alcohol is added in an amount of 10 to 120 parts by weight, with respect to 100 parts by weight of said intermediate product.

136. (Currently Amended) The highly stable polymer according to claim 132, wherein said polymer having a principal chain including at least a component unit having a pendant acid group and a component unit having a pendant hydroxyl group is formed using a non-nitrile azo-based polymerization initiator or a peroxide-based polymerization initiator.

142. (Currently Amended) A hardenable resin composition containing: the highly stable polymer according to claim 132 and other coating materials.

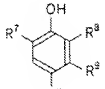
143. (Currently Amended) The hardenable resin composition according to claim 142, wherein the polymer solution is left or heated for a predetermined time for maturation after the addition

of the alcohol.

144. (Currently Amended) The hardenable resin composition according to claim 142, wherein the alcohol has a boiling point with a 75°C or less difference with respect to the boiling point of the solvent to be used and/or an evaporation rate with a 90(n-BuOAc=100) or less difference with respect to the evaporation rate of the solvent.

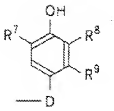
146. (Currently Amended) The hardenable resin composition according to claim 142, wherein said polymer having a principal chain including at least a component unit having a pendant acid group and a component unit having a pendant hydroxyl group is a polymer formed using a non-nitrile azo-based polymerization initiator or a peroxide- based polymerization initiator, and the polymer is reacted with the isocyanate compound, using a polymerization inhibitor selected from the group consisting of a phenol-based compound represented by the below-mentioned formula (10) and a phosphite-based compound represented by the below mentioned formula (16):

Formula (10)



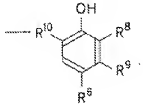
wherein R^6 is hydrogen, and alkyl group having 1 to 5 carbon atoms, or the below mentioned formula (11):

Formula (11)



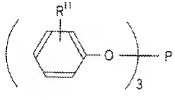
wherein D in the formula (11) is-S-, an alkylene group having 1 to 10 carbon atoms or an alkylidene group having 1 to 10 carbon atoms, R^7 is hydrogen or an alkyl group having 1 to 10 carbon atoms, R^8 is hydrogen, an alkyl group having 1 to 10 carbon atoms, or the below-mentioned formula (12):

Formula (12)



wherein R^{10} in the formula (12) is an alkylene group having 1 to 10 carbon atoms or an alkylidene group having 1 to 10 carbons atoms, R^9 is hydrogen or an alkyl group having 1 to 10 carbon atoms, however, at least one R^7 and R^8 is a tert-butyl group, or an alkyl group having a cyclohexyl group, and substituents of the same numeral can either be same or different,

Formula (16)



wherein R^{11} is hydrogen or an alkyl group having 1 to 20 carbon atoms.

147. (Currently Amended) The hardenable resin composition according to claim 146, wherein said highly stable polymer has a light transmittance of a 3-methoxy butyl acetate solution of a 20% by weight resin solid component placed in a 1 cm square quartz cell at 400 nm being 60% or more.

148. (Currently Amended) The hardenable resin composition according to claim 146, wherein said highly stable polymer has a light transmittance of 3-methoxy butyl acetate solution of a 20% by weight resin solid component placed in a 1 cm square quartz cell at 360 nm being 50% or more.

* * * * *

DETAILED ACTION

Pending Claims

Claims 66, 68-78, 80-85, 87-90, 99, 100, 103-130, and 132-148 are pending.

Response to Amendment

1. The objection to the drawings has been overcome by the replacement sheet.

2. The rejection of claims 67, 102, and 131 under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling, has been rendered moot by the cancellation of these claims.

3. The rejection of claims 66, 68-78, 80-85, 87-90, 99, 100, 103-130, and 132-148 under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling, has been overcome by amendment.

4. The rejection of claims 66, 70-78, 80-85, 99, 100, 103, 104, 107-130, and 132-148 under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling, has been overcome by amendment.

5. The rejection of claims 102 and 131 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, has been rendered moot by the cancellation of these claims.

6. The rejection of claims 99, 100, 103, 104, 107-130, and 132-148 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, has been overcome by amendment.

7. The rejection of claims 67, 102, and 131 under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, has been rendered moot by the cancellation of these claims.

8. The rejection of claims 66, 68-78, 80-85, 87-90, 99, 100, 103-130, and 132-148 under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, has been overcome by amendment.

9. The rejection of claims 66, 70-78, 80-85, 99, 100, 103, 104, 107-130, and 132-148 under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, has been overcome by amendment.

Response to Arguments

10. Applicant's arguments filed November 19, 2008 and December 11, 2008 have been fully considered but they are not persuasive.

Applicant argues that Rosenkranz et al. (GB 1,384,343) fail to reasonably teach or suggest the addition of an alcohol, and the resulting stabilized material. Specifically, they argue that the phenol derivatives and hydroquinone derivatives are provided as anti-oxidants, and not as reactive materials providing stabilization to the solution.

The Examiner respectfully disagrees because the disclosed *phenol derivatives* and *hydroquinone derivatives* fall within the generic scope of *alcohol*. Applicant has failed to provide evidence showing that these materials would not have behaved, to some degree, as claimed. Turning to Applicant's disclosure *(see page 46)*, it is clear that *phenol derivatives* and *hydroquinone derivatives* were not contemplated by Applicant as this reactive/stabilizing

alcohol. Furthermore, the skilled artisan would not have been motivated to substitute the phenol derivatives and hydroquinone derivatives of Rosenkranz et al. with the alcohols set forth in Applicant's specification. This is because the phenol derivatives and hydroquinone derivatives of the prior art are only disclosed in the capacity of non-reactive thermal inhibitors, and the alcohols set forth in Applicant's specification are not recognized in the art in this capacity.

Comments Regarding the Examiner's Amendment

11. The claims have been amended as follows:

- Independent method claim 66 was amended as follows:
  - Language regarding an *intermediate product* was introduced to better define the reaction product of the first step. It was also introduced to alleviate a lack of antecedent basis for the term "a reaction product".
  - A step of *preparing a solution* was introduced to alleviate a lack of antecedent basis for the term "the solution".
  - **The alcohol has been further limited to materials discussed in the specification *(see page 46)***. This limitation sufficiently distinguishes the instant invention from the prior art.
- Independent product-by-process claims 99, 100, and 132 have been put into dependent form, wherein they disclose and further define a highly stable polymer comprising a polymer *obtained by the method according to claim 66*.
- Independent composition claims 103, 104, and 142 have been put into dependent form, wherein they disclose a hardenable composition containing *the highly stable polymer*

according to claim 99/100/132 and *other coating materials (see page 17 of the specification)*.

- Independent method claim 105 has been put into dependent form, wherein it discloses a production method for a hardenable composition comprising the steps of: *(1) forming a highly stable polymer according to the production method of claim 66; (2) leaving or heating the polymer solution for a predetermined time for maturation; and (3) adding other coating materials to the matured polymer solution.*
- Independent method claim 106 has been put into dependent form, further limiting claim 105.
- The remaining changes address language consistency.

12. The rejection of claims 67, 102, and 131 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Rosenkranz et al. (GB 1,384,343) has been rendered moot by the cancellation of these claims.

13. The rejection of claims 66, 68-75, 80-82, 87, 99, 100, 103-112, 116-121, and 125-127 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Rosenkranz et al. (GB 1,384,343) has been overcome by amendment.

14. The rejection of claims 76-78, 83-85, 88-90, 113-115, 122-124, 128-130, and 132-148 under 35 U.S.C. 103(a) as being unpatentable over Rosenkranz et al. (GB 1,384,343) has been overcome by amendment.

Allowable Subject Matter

15. Claims 66, 68-78, 80-85, 87-90, 99, 100, 103-130, and 132-148 are allowed.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/
Primary Examiner, Art Unit 1796

March 15, 2009